National SCIENCE Challenges
SUSTAINABLE SEAS
Ko ngā moana whakauka

How do I consider new consents activities in a cumulative effects framework?

For regional councils and consultants

Cumulative effects can result from multiple stressors (or repeated occurrences of a single stressor). Assessment of cumulative effects when consenting new activities is a requirement under the RMA, but consideration of them is generally limited due to the perceived difficulties in doing so. This guidance document sets out some simple well-established principles to follow when assessing for cumulative effects, or when determining the type of data and methods required for such an assessment. These principles can be applied when even when information is scarce.

Background information required for a cumulative effects assessment framework:

- The area to be managed. The location of the proposed consent activity may be relatively small, but consent conditions may have to take into marine species or processes being mobile, or stressors originating from outside the activity site. The size of the management area is assessed against the risk of desired outcomes not being able to be met by management within it. To gather this background information use Roadmaps to EBM: *Ecological considerations for determining the size of an area for management actions.*
- Knowledge of the ecological response footprint, ecological health and stressors status within the management area – use Calculating ecological response footprints (ERF) and Assessing present health.

We suggest that dealing with cumulative effects assessments will become easier if a database of consents applications and decisions is created as a reference for the assessment of new activities. Incorporated in this could be data on stressors (see section B1b below) and linked to it could be information on ecological status.

Assessing cumulative effects of new activities (or renewals)

The document Addressing cumulative effects in marine management decisions lists a 4-step process

1. What ecological state do you want for the area? Determine the aims and objectives for this location.

2. Identify what's affecting the place.

3. Identify the state of the current ecosystem within the area of concern and over a wider relevant spatial scale (eg estuary, bay etc) and how it's responding to the stressors.

4. Identify the best management approach.

The present guidance fits within these overarching four steps starting with step 2.

A. To identify the stressors that will be produced by the activity and where they will be located use the Activity stressor table. It may also be appropriate to consider climate change, particularly for strategic planning – use the Climate change stressors table.

B. Following this ask whether these stressors already exist in the management area and within the ecological response footprint? For example, an open bay may already have sedimentation, nutrients and fishery impacts.

1. If the new activity will produce stressors that already exist (eg sedimentation), will the present stressors change in intensity or merely extent

   a. If extent, update ERF and/or

   b. If intensity, update the stressors' status database

2. If the new activity will produce stressors that don't already exist, update the ERF and stressors' status database to include these stressors.

Next, within step 3, the following considerations should be addressed using the table below.

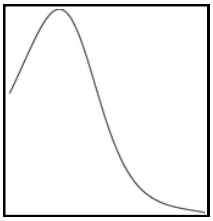
A. An assessment of the updated stressors' status against the present ecological status.

B. Knowledge of how many consents that relate to these stressors have been made that affect the ERF since the last time that ecological status has been assessed .

C. A quantification of the risks and uncertainties related to allowing the new activity, including risks associated with the status quo (ie rejecting the activity).

Finally, within step 4, the decision can be made around allowing the new activity as is, or setting conditions around the activity, eg monitoring. The initial assessment presented in the table may suggest minimal risk or the need to consult with Council science experts. The result of this consultation may highlight the need for a more far-reaching assessment of the proposal. At this stage, the decision to proceed will require others in council and a more extensive risk assessment. This risk assessment should be one that links ecological health impacts with social and cultural impacts as well as any impacts on the economies of other activities (see Addressing risk and uncertainty in decision-making). Such risk assessments can best be done by using a participatory workshop to set up a conceptual map of the ecological, social, cultural and economic landscape and use this to populate a Bayesian network or Agent-based participatory model. This model can be used to test scenarios of adaptive management, relocation of activities and mitigation strategies.

Table based on stressor principles in Gladstone-Gallagher et al 2024. Note that if the ecological status (health) has not been calculated recently, the precautionary principle should come into play.

S1	The number of stressors	Unless the present health is low, if the activity increases the number of stressors then the environmental risk is moderate to high, as adding more stressors increases the unpredictability of outcomes. Whether the risk is moderate or high depends on the S2 to S4 updated status.
S2	Level of stressors that accumulate – for example nutrients, plastics, sediments, heavy metals, as opposed to temperature, disease, noise, light, invasive species	Unless the present health is low, the number of consents for activities creating these types of stressors since the last ecological status assessment needs to be considered. If the levels of each type of these stressors are updated on a yearly basis then this information could be analysed to create a prediction of number of consents (based on size) that should be allowed in the next year.
S3	Levels of stressors that generate unimodal (Figure 1) responses – for example, temperature, nutrients, sediment, organic enrichment  *Figure 1: Unimodal response*	If the level of these stressors remains 'low', the risk of from the activity is low. If the level increases from 'low' then the risk is moderate to high. Further separation between moderate and high risk can be determined, if necessary, by considering the number and level of S4 stressors and the present health.
S4	Levels of stressors that generate responses other than unimodal, for example most chemical contaminants	The risk of cumulative effects increases as the levels of any stressors of this type increases above low levels and with the number of stressors showing the increase.
S5	Number of points of impact and indirect effects on an ecological network	Cumulative effects can be generated by a single stressor that impacts a number of ecological components (directly or indirectly see definitions below). Increases in level of any of these types of stressor increases the risk to the ecological health from the activity generating that stressor(s).
S6	Size of the impacted area (relative to the ecosystem of interest or managed area).	An activity which covers a large area increases the risk of spillover impacts to other areas through effects on ecological connectivity. It also increases risks to other activities.

Summary

Risk on the environment of permitting the new activity increases as the number of stressors (S1), the number of direct and indirect effects (S5) and the size of the area affected by the activity (S6) increases. These risks are then worsened by the updated levels of stressor principles S2, S3 and S4, particularly in areas of high ecological health where long-lived habitat-forming species are declining in abundance (ecological principle 1) and where ecological networks are showing signs of reduction in complexity (ecological principle 2) (Gladstone-Gallagher et al 2024).

These risks are related to the complicated problem of dealing with cumulative effects resulting from a new activity. This document does not deal with the problem of lack of guidance on categorising stressors into low, medium or high levels, nor lack of numeric data on the various stressors in place. We suggest that, were councils to keep and share consent databases, considerable progress could be made in these areas.

Further reading: Gladstone-Gallagher R, Hewitt J, Low J, Pilditch C, Stephenson F, Thrush S & Ellis J (2024). Coupling marine ecosystem state with environmental management and conservation: A risk-based approach. Biological Conservation, 292, 110516.